

Ilonka Aylward  
v.  
City of Charlotte  
and  
Charlotte-Mecklenburg Stormwater Services (a.k.a. “Charlotte Stormwater Services,”  
a.k.a. “Charlotte/Mecklenburg Storm Water,” a.k.a. “Charlotte Storm Water Services,”  
a.k.a. “City of Charlotte Storm Water Services”)  
and  
Armstrong Glen, P.C.  
and  
Joseph (“Josh”) H. Letourneau, P.E.

**Ilonka Aylward’s Complaint**

## **Exhibit 17**

# PLANNING STUDY

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## HINSDALE-TINKERBELL STORM DRAINAGE IMPROVEMENT PROJECT

### Selected Alternative

City Project No. 671-12-015

Prepared for:



Prepared by:

*Armstrong Glen, P.C.*



January 23, 2014

### SA3.2 – Hinsdale Street Culvert (Including Line G)

#### Summary of Storm Drain Problems

This section of the analysis contains the 84" CMP Hinsdale Street culvert, located at 2818 Hinsdale Street. Connected to this culvert is a 15"/18" pipe system (Line G) draining 2 catch basins adjacent to the culvert.

The Hinsdale Street culvert is severely undersized, causing upstream ponding and street flooding. The ponding overtops Hinsdale Street for the 2-year storm event (existing and future conditions). Street flooding depth at this culvert reaches over 2 feet during the 100-year storm event (existing conditions). Line G meets standards with 100-year level of service for existing conditions, and 10-year level of service for future conditions.

#### Proposed Improvements

In order to eliminate structural flooding upstream of the Hinsdale Street culvert for the 100-year storm event, the existing 84" CMP is proposed to be upsized to an 18'x8' reinforced concrete box culvert (RCBC) buried one-foot. As a result of sizing the culvert to prevent structural flooding, Hinsdale Street is protected from overtopping during the 100-year storm event. Since the goals of the Selected Alternative require protecting structures from flooding, the proposed culvert size matches the City Design Standard.

A geotechnical investigation will be required at the headwalls of the proposed 18'x8' RCBC. Foundation protection will not be required in this location, but borings at each end of the culvert will provide soil data necessary to design the proposed wingwalls and footings of the headwall.

Numerous utilities will present challenges during the construction of the 18'x8' RCBC. An underground electric line is located adjacent to the proposed culvert which will have to be relocated. In addition, a 6" water main, gas main, and underground communications lines will all likely require relocating. The 8" sanitary sewer may need to be relocated to avoid the wingwall of the downstream headwall. Coordination the utility companies will be required in this area.

Due to the size of the 18'x8' RCBC, closure of Hinsdale Street will be necessary to safely install the culvert. During construction, the road will be closed to thru traffic, and residents will be able to access their property from either Highview Road or Tinkerbelle Lane. The resident at 2813 Hinsdale Street will require a temporary driveway during construction, as the existing driveway is located over the proposed location of the culvert.

Several medium sized trees, located around both existing headwalls, will likely be removed to accommodate the new headwalls.

The cost to construct the 18'x8' RCBC, including wingwalls, utility relocations, pavement replacement, tree removal, removal of existing 84" CMP, etc. is estimated to be around **\$337,270.45**. See **Appendix SA-3 Construction Cost Estimate** for a detailed construction estimate for this section of the project.

See **Figure SA-1 (A-D) Selected Alternative – Proposed Layout** for a summary of the improvements along this section of the project. See **Tables SA-1 Potential Street Flooding and SA-2 Potential Structural Flooding** for a summary of how the proposed improvements address the existing flooding issues.

### SA3.3 – Open Channel 2 - (Hinsdale St. Culvert to Highview Road Culvert)

#### **Summary of Storm Drain Problems**

This section of the analysis contains 400 linear feet of open channel, starting at the upstream headwall of the Hinsdale Street culvert and extending upstream to the downstream headwall of the Highview Road culvert.

Ponding from the undersized Hinsdale Street culvert reaches the first two houses upstream of the Hinsdale Street culvert. LAG flooding is predicted at 2812 Hinsdale Street for the 25-year storm event (future conditions). LAG flooding is predicted at 2818 Hinsdale Street for the 50-year storm event (existing conditions) and for the 10-year storm event (future conditions). This section of the open channel has 100-year flow rates of 559 cfs (existing conditions) and 996 cfs (future conditions). The channel overtops its banks for the 2-year storm at 9 cross sections (total of 11 cross sections) for existing conditions.

The owner at 2824 Hinsdale Street reported channel erosion and yard flooding. They filed an Emerald Request (now closed) years ago regarding channel blockage. The owner at 3300 Tinkerbelle Lane reported channel erosion behind their house, and crawl space flooding more than once per year. Crawl space flooding may be due to an undersized pipe system (see Line H analysis) between 3300 & 3310 Tinkerbelle Lane.

Per the Channel Stability Assessment Report, the severity of erosion along this section of channel is broken out as follows:

<u>Erosion</u>	<u>LF of Bank</u>
Stable	586
Mild	0
Moderate	151
Severe	50

25% of the banks along Channel Segment 2 contain either moderate or severe erosion. Most of this channel is stable with only a small section of severe erosion around the downstream headwall of the Hinsdale Street culvert (which will be addressed with the proposed headwall). See **Appendix SA-5 Channel Stability Assessment Report**, for a detailed summary of the existing erosion issues along Channel Segment 2.

#### **Proposed Improvements**

Upstream improvements will increase flow and velocities along Channel Segment 2, as shown in **Table SA-3 Open Channel Velocity Comparison**. The overall average velocity along this reach is predicted to increase 3.3 ft/s, with the highest increase of 8.6 ft/s between 2812 & 2818 Hinsdale Street. The velocity decreased at a few of the cross sections due to the widening of the channel to accommodate the new upstream and downstream culverts.